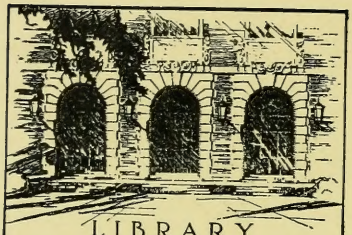
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Entomological Series
CIRCULAR 3, Revised

# METHOD OF DESTROYING GRASSHOPPERS

BY W. P. FLINT
Chief Field Entomologist

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# METHODS OF DESTROYING GRASSHOPPERS

By W. P. FLINT, Chief Field Entomologist
State Natural History Survey

Grasshoppers are not among our most destructive insects, but they certainly may be classed as regular boarders on most Illinois farms Nearly every year there are parts of the state where it takes all the profits on certain crops, and in some cases all of the crops, to board

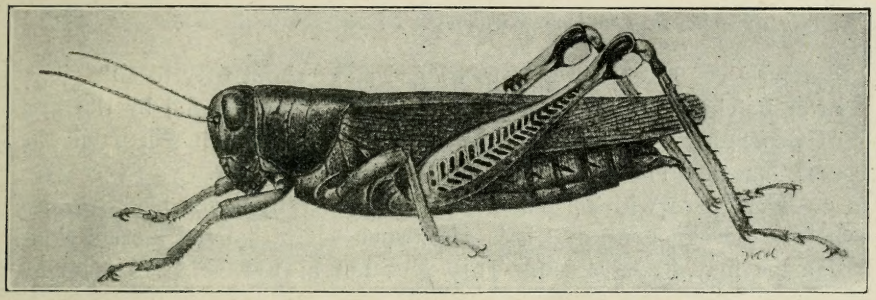


FIG. 1. A common Grasshopper (*Melanoplus differentialis* Thomas).

the grasshoppers. Most of this loss is easily preventable. It is possible not only to kill the hoppers, but, by measures that have recently come into use in the western states, to make them pay for the labor involved and possibly something more.

There are a number of kinds of grasshoppers in this state, but those that do most of the damage to crops have very similar habits. The females of the injurious kinds lay their eggs during the fall in small holes in the ground which they dig with the horny tip of the abdomen.

The eggs are generally laid along roadsides, ditch banks, and hedgerows, but may sometimes be found in clover, alfalfa, timothy, pastures, and even in corn. From fifteen to fifty eggs are laid in each hole, where they are held together by a sticky fluid which soon dries and seals them over, protecting them to some extent from the weather. They hatch during May and June. The young hoppers are so small that for the first two or three weeks they are not readily noticed by

one walking through a field where they are abundant, but a close examination made from the 10th to the 25th of June should enable one to tell whether they are numerous enough to threaten injury, and if such is the case control measures should be started at once. They grow at a fairly rapid rate, changing their skins as they increase in size, and

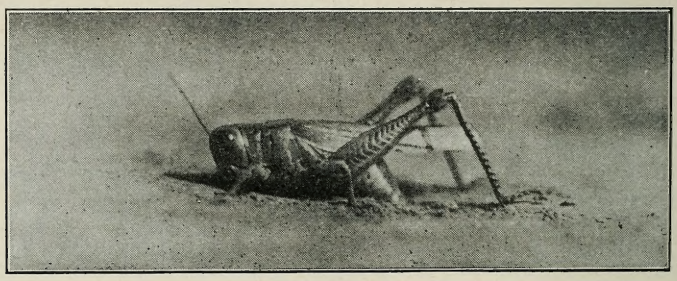


FIG. 2. Female grasshopper laying eggs in ground.

generally reach the full-grown, winged stage about fifty to sixty days after hatching. They continue to feed in this stage and by the first of September the females begin laying the eggs which will hatch the next season. There is one complete brood each year.

Dry years with open late falls are generally favorable to grasshopper development, and it is after such years that the most serious damage may be expected. This does not always hold true, as the

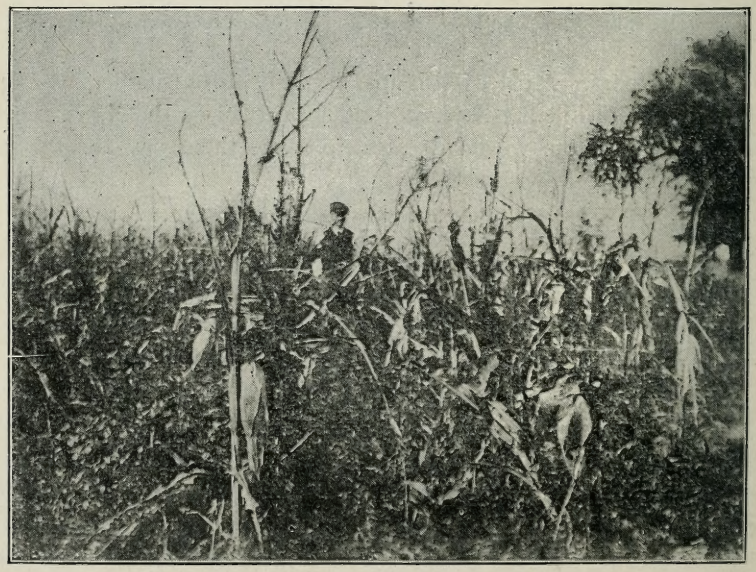


FIG. 3. Corn seriously damaged by grasshoppers, Sangamon county, Illinois, 1918.

grasshoppers have a number of natural enemies that sometimes check their increase.

The crops most seriously damaged in Illinois are clover, alfalfa, timothy, pasture grasses, soy-beans, cow-peas, and corn. If the weather continues warm late into the fall there may be some injury to wheat, and in years when the hoppers are very abundant young orchards are sometimes seriously injured.

## Control Measures

### Poisoning

One of the most effective ways of destroying grasshoppers is by the use of a poisoned bait attractive to them. The medium most generally and successfully used for this purpose is a bran mash. This is prepared by mixing together

25 lbs. dry bran
1 lb. white arsenic
or
1 lb. Paris green

Mix this into a stiff mash by adding water into which has been stirred 2 quarts of cheap molasses, black strap preferred.

Care should be taken to mix all the materials thoroughly. This may be done in a tub, tank, wagon-box, or, for large amounts, on a tight floor or pieces of canvas spread on the ground, using shovels to stir the ingredients. The mash should be sowed broadcast over infested fields at the rate of five to ten pounds per acre. It may be sown by hand from a tub set in a wagon, or with an end-gate oats seeder. If the latter method is used, care should be taken to see that the bran is not sown too thickly. The mash may be applied in strips about a rod wide and the same distance apart, as the odor will attract the hoppers for some distance, but it is better to cover the whole field if the hoppers are very numerous. One application rightly made should kill from 50% to 75% of the hoppers. It is often possible to kill large numbers of hoppers when cutting the first crop of clover. Leave several strips of a half acre or more uncut, and when the hoppers have gathered in these, sow liberally with the poisoned bran. In this way damage to the second crop of clover may be prevented at small expense.

Do not look for dead hoppers until the second or third day after the mash has been put out, as it acts rather slowly. The mash may be safely used in any crop, but it is not advisable to sow it near buildings

where chickens can pick up large amounts of it. At present prices it will cost from sixty to seventy-five cents for the materials to treat an acre of ground.

This method of killing grasshoppers has been found so effective that its use has been made compulsory under certain conditions in parts of Kansas. The county furnishes the materials, which are mixed at central stations under the direction of township officials, and distributed as nearly as possible on the same day in all infested fields in the county. Amounts running into the hundreds of tons have been put out in this way.

## CATCHING

A machine for catching grasshoppers commonly known as a hopperdozer has been used in this state more or less for a number of years. Another type of catcher has been in use in the western states for some time and has been successfully operated in Illinois during the past three seasons. With this latter type of machine, the general appearance of which is shown in Figures 4 and 5, the hoppers are caught alive and may be sacked and dried for chicken or hog feed during the winter, furnishing a food very high in protein which may be worth more than the expense of catching the hoppers.

The machine consists of a box 12 to 18 feet long and 2 feet high by 2 feet wide. The top and back of the box should be made of wire screen, and at least a part of the top should form a hinged cover through which the hoppers may be removed. The front is formed of a curved shield, 3 feet and 6 inches high, covered with tin or oilcloth and extending down to within 2 inches of the bottom. Below this shield is a curved tin lip extending downward and backward into the box and forward and upward about three inches in front of it. The box is set on runners made of $2 \times 4$'s attached to a $2 \times 6$ which extends across the entire front and projects for three or four feet at each end. A little study of the plans shown in the two-page Figure 6 will enable any one to build one of these catchers.

The hoppers are caught by hitching a horse to each end of the $2 \times 6$ and dragging the machine back and forth across the field. They fly against the shield, and slide down it and back into the box on striking the tin lip at the bottom. The back and top of the box, being made of wire screen, admit the light, and the hoppers nearly all try to escape in this direction instead of under the shield. When the box has become partly filled with hoppers the space between the lip and the

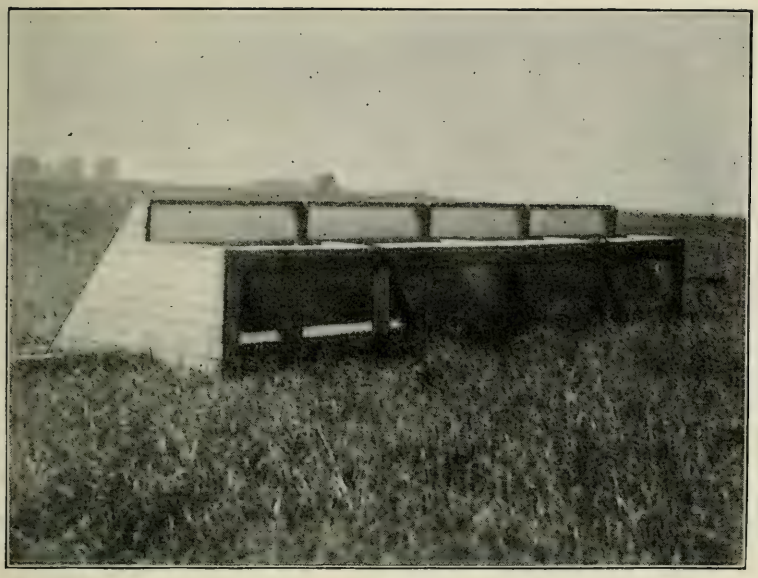


FIG. 4. Rear view of hopper-catcher, showing covered back of box.

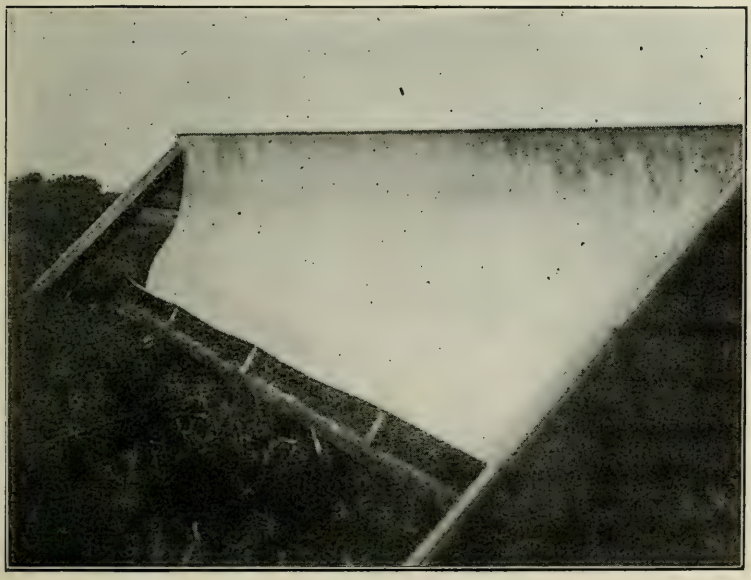
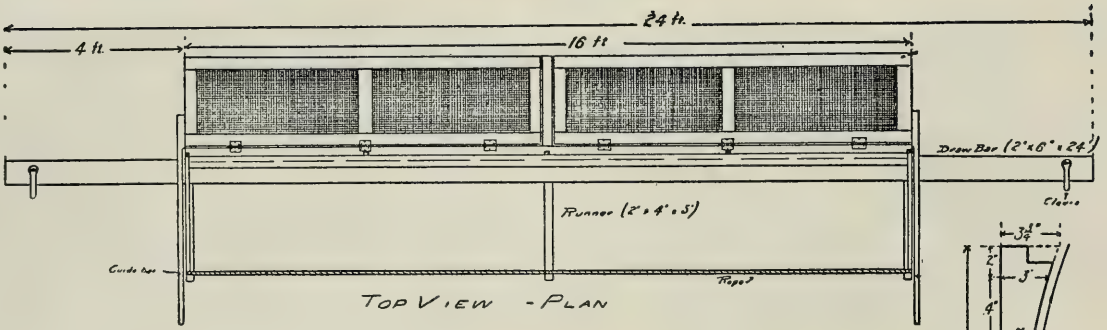
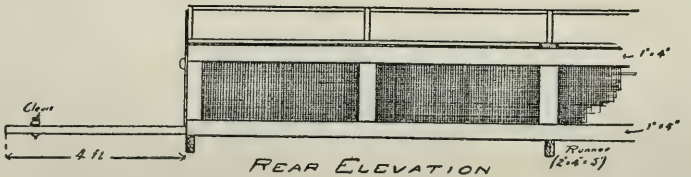


FIG. 5. Front of hopper-catcher, the shield and projecting lip at the bottom.

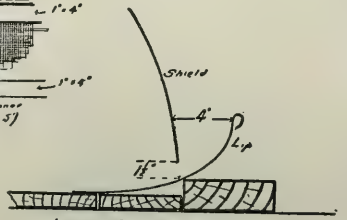



TOP VIEW - PLAN

TIN SHIELD AND SHIELD SUPPORT




REAR ELEVATION




LIP CONSTRUCTION

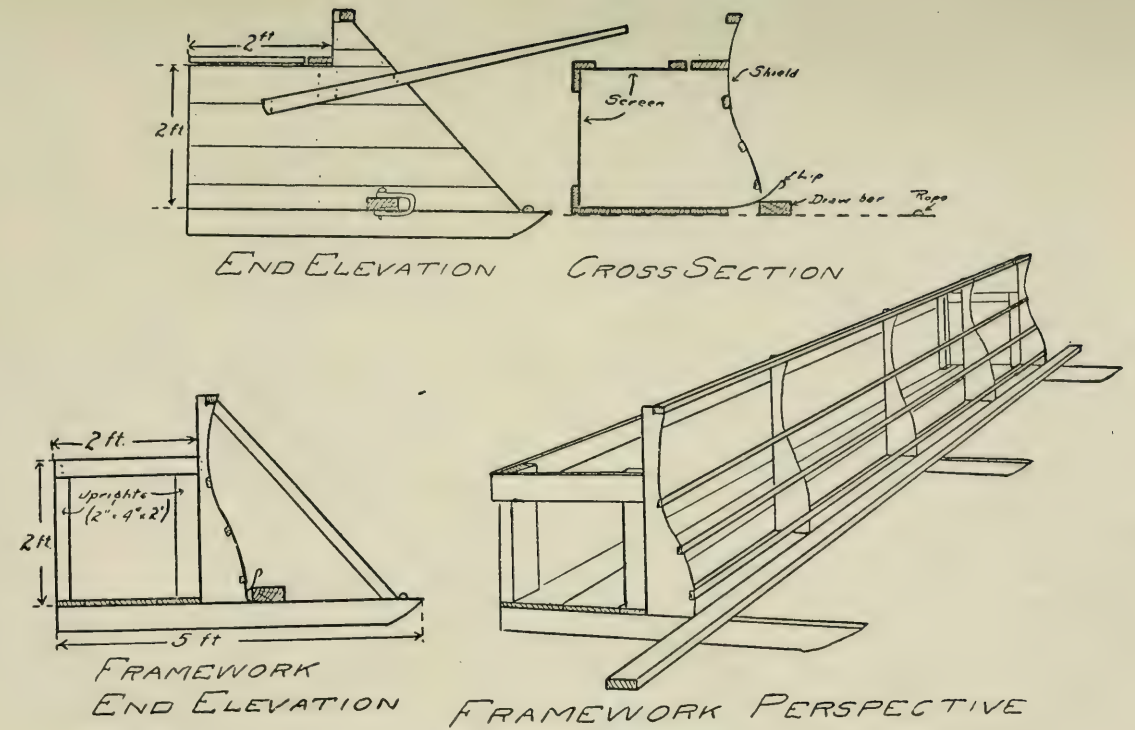



FIG. 6. Plans for grasshopper-catching machine. (From Circ. 76, Montana Agr. Expr. Station.)

shield may be stopped up and the catch scooped out and sacked. The sacks should be hung where they will be fully exposed to the sun and wind. The hoppers will dry in about two weeks of bright weather, and may then be removed to some dry shelter for use during the winter. *Do not pile the sacks of hoppers on the ground;* that will cause their decay. Chemical analyis of the dried hoppers shows that they contain about 75% protein and are fairly high in fat and phosphorus. At the present price of tankage they should be worth not far from a dollar a bushel. Where the hoppers are abundant, from one to three bushels per acre have been caught with this machine.

The hopperdozer is made in about the same way as the catcher without the box, but having a shallow trough or pan twenty inches wide, with six-inch sides, set on the $2 \times 4$ runners directly in front of the shield. This pan should have partitions across it every three or four feet. To operate the hopperdozer, partly fill the pan with water, pour a little kerosene on top, and drag across the infested fields. The hoppers striking the shield fall into the pan, where they are quickly killed by the oil. Once having become wet with the kerosene they will die in a few minutes even though they hop out of the pan.

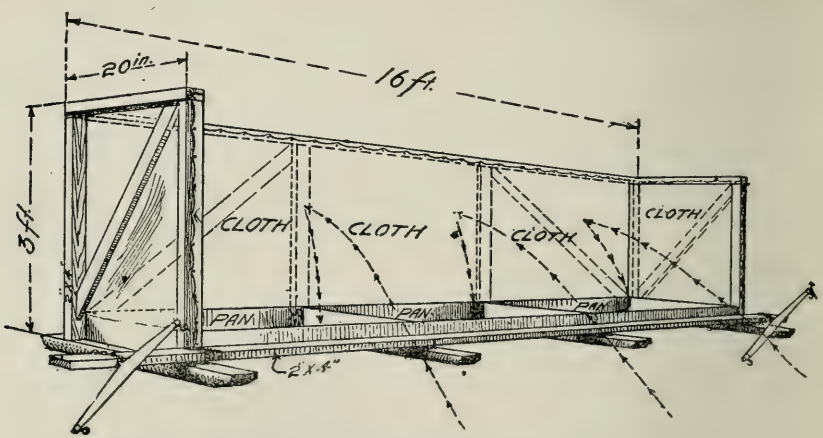



FIG. 7. Hopperdozer with cloth back, showing construction. (From Farmers' Bull. 747, U. S. Dept. Agr.)

The hopperdozer is somewhat easier and less expensive to build than the catcher, and is about as effective. A catch of sixty bushels on twenty acres of clover was recently made with one of these machines. It is more expensive to operate, as the oil has to be renewed every few rounds of the field. It can not be used to advantage on rough or hilly ground. Hoppers caught with the dozer can not be used for feed.

Either of these machines if well built and housed will last for several seasons and may be used by a number of farmers in the same neighborhood.

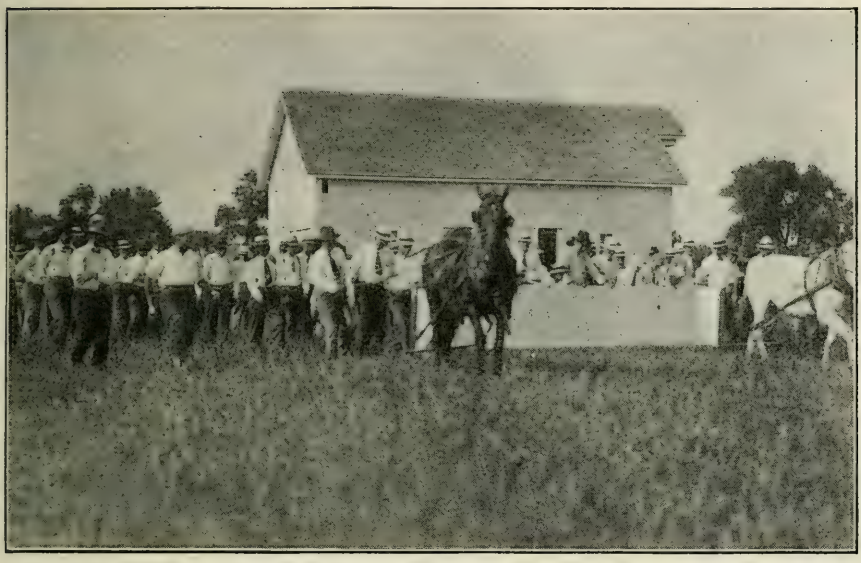


FIG. 8. Demonstration in use of hopperdozer, Hancock county, Illinois, July, 1918. During the season over 100 bushels of hoppers were caught with this machine.

## DOES IT PAY TO CONTROL GRASSHOPPERS?

It has recently been shown by some work done in Arizona that where the hoppers average seventeen to the square yard of alfalfa over a forty-acre field they will eat a ton of hay per day. Where there was only one hopper to the yard they ate three pounds per day, per acre. It is not at all unusual to find an average of ten to thirty grasshoppers per yard in clover fields in this state, and at the present prices of hay it will certainly pay to control them. Even where the hoppers are only moderately abundant it will pay to use the catcher if they are saved for feed.

Urbana, Ill., February, 1921.

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